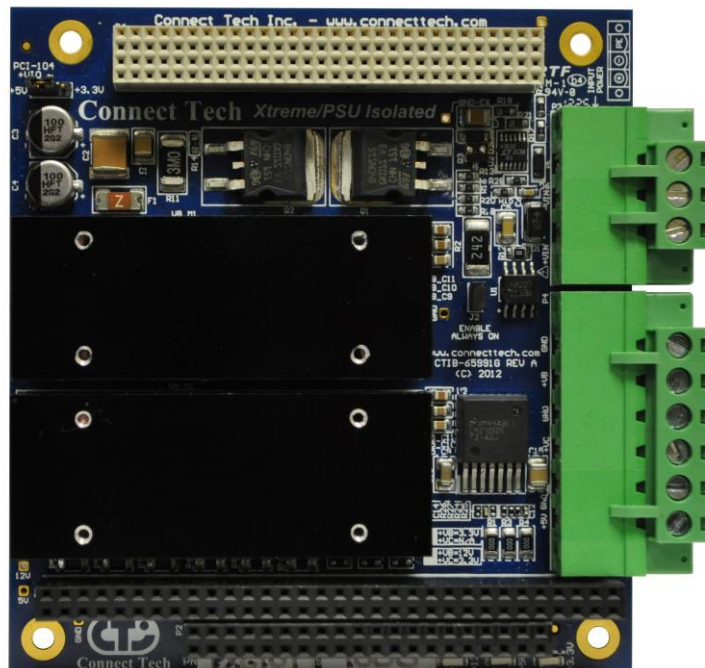




**Connect Tech Inc.**  
*Embedded Computing Experts*

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# Xtreme/PSU Isolated User Manual



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## Revision History

Revision	Date	Change(s)
0.00	2012-10-09	Initial Manual Revision Created
0.01	2012-12-10	Additional Rise-Time and Switching Frequency data added
0.02	2013-05-02	Updated Pinout Diagrams and Tables
0.03	2013-08-07	Updated Ripple and Noise Details
0.04	2015-04-09	Added jumper note.

## Customer Support Overview

If you experience difficulties after reading the manual and/or using the product, contact the Connect Tech Inc. reseller from which you purchased the product. In most cases the reseller can help you with product installation and difficulties.

In the event that the reseller is unable to resolve your problem, our highly qualified support staff can assist you. Our support section is available 24 hours a day, 7 days a week on our website at: [www.connecttech.com/sub/support/support.asp](http://www.connecttech.com/sub/support/support.asp). See the contact information section below for more information on how to contact us directly. Our technical support is always free.

## Contact Information

We offer three ways for you to contact us:

### Mail/Courier

You may contact us by letter at: Connect Tech Inc.  
Technical Support  
42 Arrow Road, Guelph, ON  
Canada N1K 1S6

### Email/Internet

You may contact us through the Internet. Our email and URL addresses on the Internet are:

[sales@connecttech.com](mailto:sales@connecttech.com)  
[support@connecttech.com](mailto:support@connecttech.com)  
[www.connecttech.com](http://www.connecttech.com)

### Note:

Please go to the [Download Zone](#) or the [Knowledge Database](#) in the [Support Center](#) on the Connect Tech Inc. website for product manuals, installation guides, device driver software and technical tips. Submit your technical support questions to our customer support engineers via the [Support Center](#) on the Connect Tech Inc. website.

### Telephone/Facsimile

Technical Support representatives are ready to answer your call Monday through Friday, from 8:30 a.m. to 5:00 p.m. Eastern Standard Time. Our numbers for calls are:

Telephone: 800-426-8979 (North America only)  
Telephone: 519-836-1291 (Live assistance available 8:30 a.m. to 5:00 p.m. EST, Monday to Friday)  
Facsimile: 519-836-4878 (online 24 hours)

## Introduction

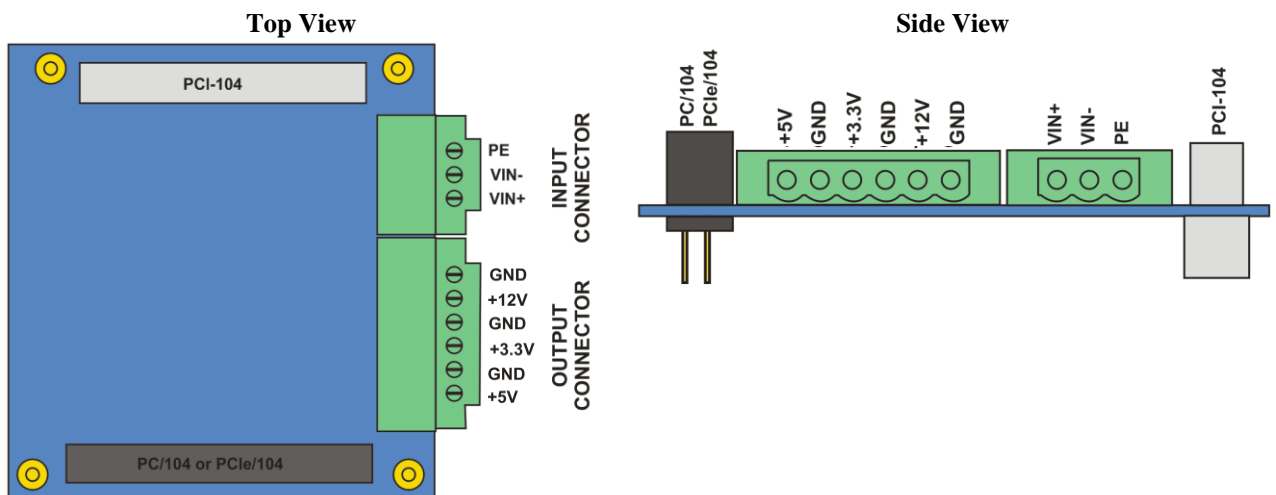
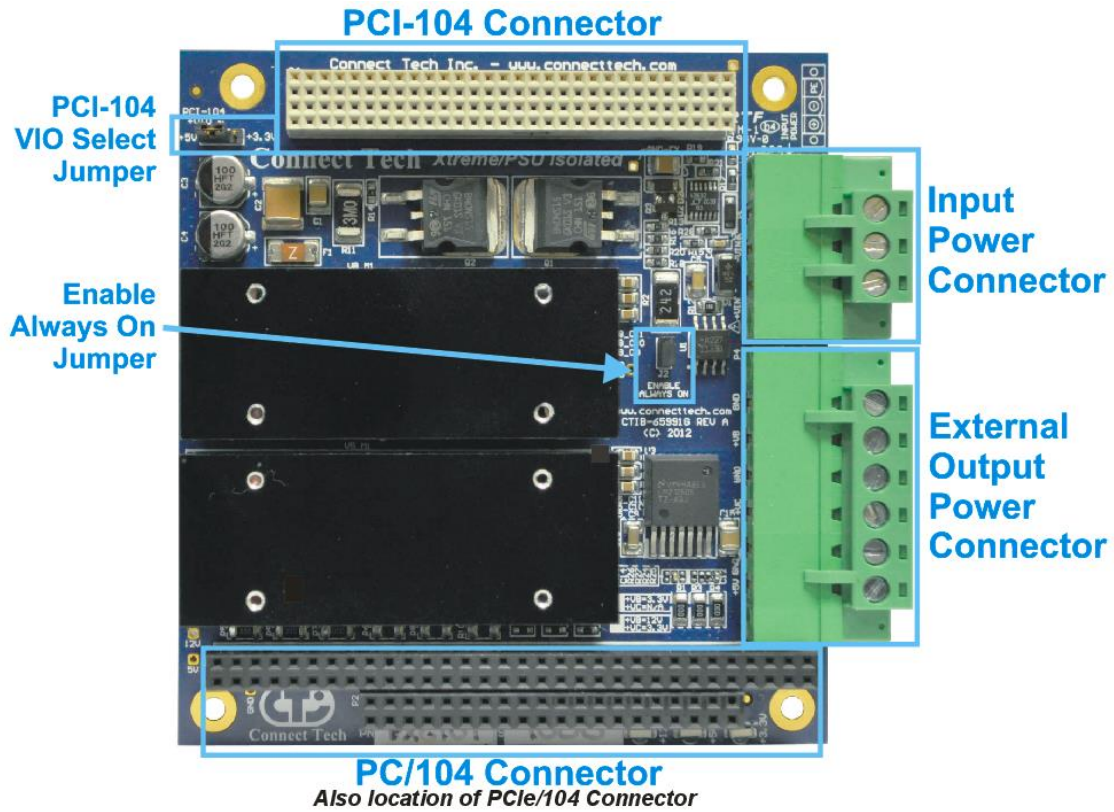
Connect Tech's Xtreme/PSU Isolated power supply is a high efficiency, high powered Isolated PC/104 form factor power supply with extended temperature capabilities. Xtreme/PSU Isolated provides isolated power to on-board terminal block connectors and also directly powers all of the PC/104 family expansion buses such as PC/104, PC/104-Plus, PCI-104, PCI/104-Express and PCIe/104. The Xtreme/PSU Isolated is a highly reliable power supply which provides up to 195W of total output power with +3.3V, +5V, and +12V output voltages. It can be used as a stand-alone power supply to power any other embedded system, or used directly to power any PC/104 stack or single board computer (SBC). The Xtreme/PSU Isolated power supply has a wide input voltage range that accepts +9V to +36V DC and is specifically designed for use in a broad range of rugged applications including military, industrial, and air and ground vehicles. Xtreme/PSU Isolated power supply can be used in combination with Connect Tech's stackable CPU and expansion boards for a total design solution.

## Detailed Technical Specifications

Specification	Details
<b>Dimensions</b>	<ul style="list-style-type: none"> <li>3.550" x 3.775" (90mm x 96) PC/104 Compliant</li> <li><a href="#">Download 3D Model Files (Click Here)</a> - .step model files</li> </ul>
<b>Input Voltage Range</b>	<ul style="list-style-type: none"> <li>+9V to +36V DC</li> <li>Advanced input protection from spikes, surges, noise, over-voltage and over-current.</li> </ul>
<b>Isolation</b>	<ul style="list-style-type: none"> <li>Up to 2.25kV of galvanic isolation</li> <li>Output power and GND completely isolated from input power</li> <li>All PC/104 rail power is also isolated from input power</li> </ul>
<b>+5V Output</b>	<ul style="list-style-type: none"> <li>Up to 15A maximum</li> <li>1% Output regulation accuracy</li> <li>PXG10X/20X: &lt;125mV p-p ripple/noise at full load. PXG30X: &lt;150mV</li> <li>Output Current Limiting Protection</li> <li>Output Overvoltage Protection</li> <li>Remote ON/OFF control</li> <li>Switching Frequency: 235kHz</li> </ul>
<b>+12V Output</b>	<ul style="list-style-type: none"> <li>Up to 10A maximum</li> <li>1% Output regulation accuracy</li> <li>PXG10X: &lt;125mV p-p ripple/noise at full load. PXG30X: &lt;150mV</li> <li>Output Current Limiting Protection</li> <li>Output Overvoltage Protection</li> <li>Remote ON/OFF control</li> <li>Switching Frequency: 275kHz</li> </ul>
<b>+3.3V</b>	<ul style="list-style-type: none"> <li>Up to 20A maximum</li> <li>1% Output regulation accuracy</li> <li>&lt;80mV p-p ripple/noise at full load. (all series)</li> <li>Output Current Limiting Protection</li> <li>Output Overvoltage Protection</li> <li>Remote ON/OFF control</li> <li>Switching Frequency: 250kHz</li> </ul>
<b>Operating Temperature</b>	<ul style="list-style-type: none"> <li>-40 to +85 Degrees Celsius</li> <li>See derating section for full details on current consumption vs. input voltage.</li> </ul>
<b>Warranty and Support</b>	<ul style="list-style-type: none"> <li>1 Year Warranty</li> <li>Free Technical Support</li> </ul>

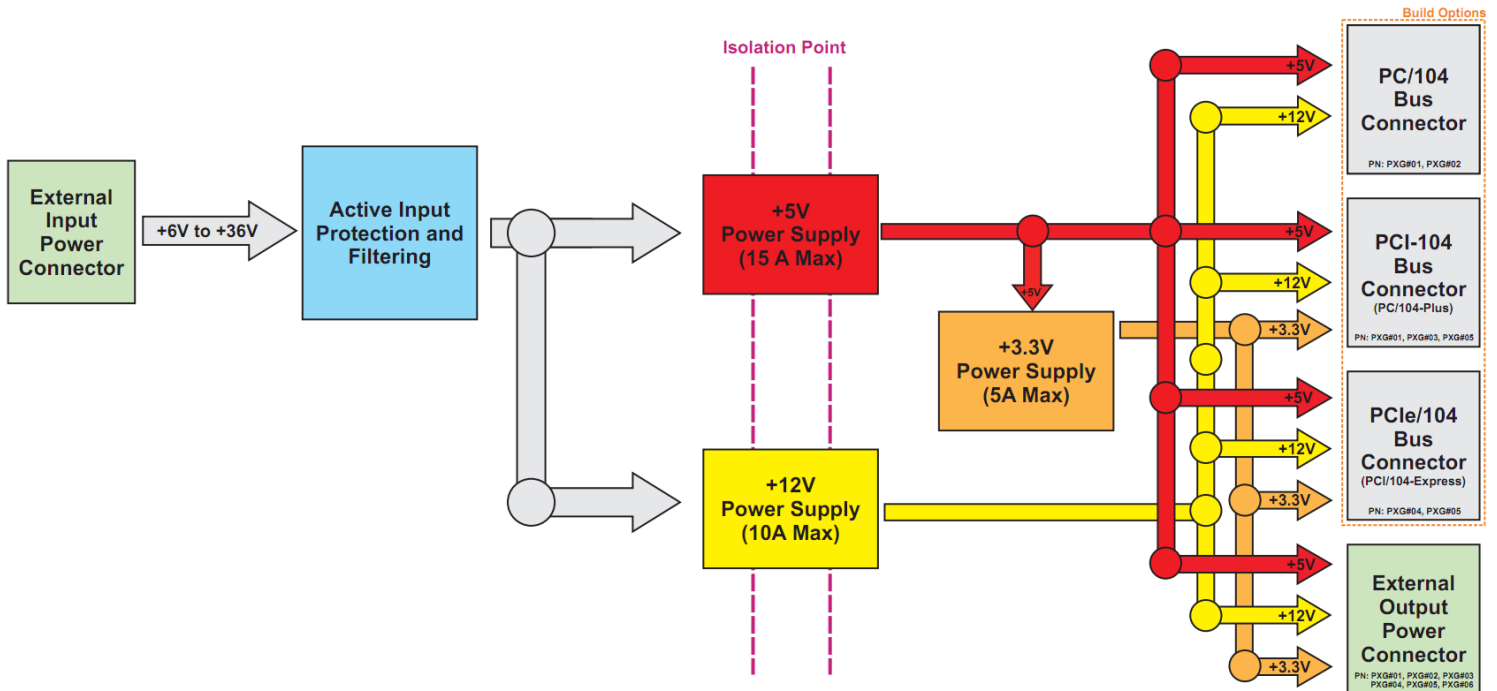
## Board Diagrams

Board Photo



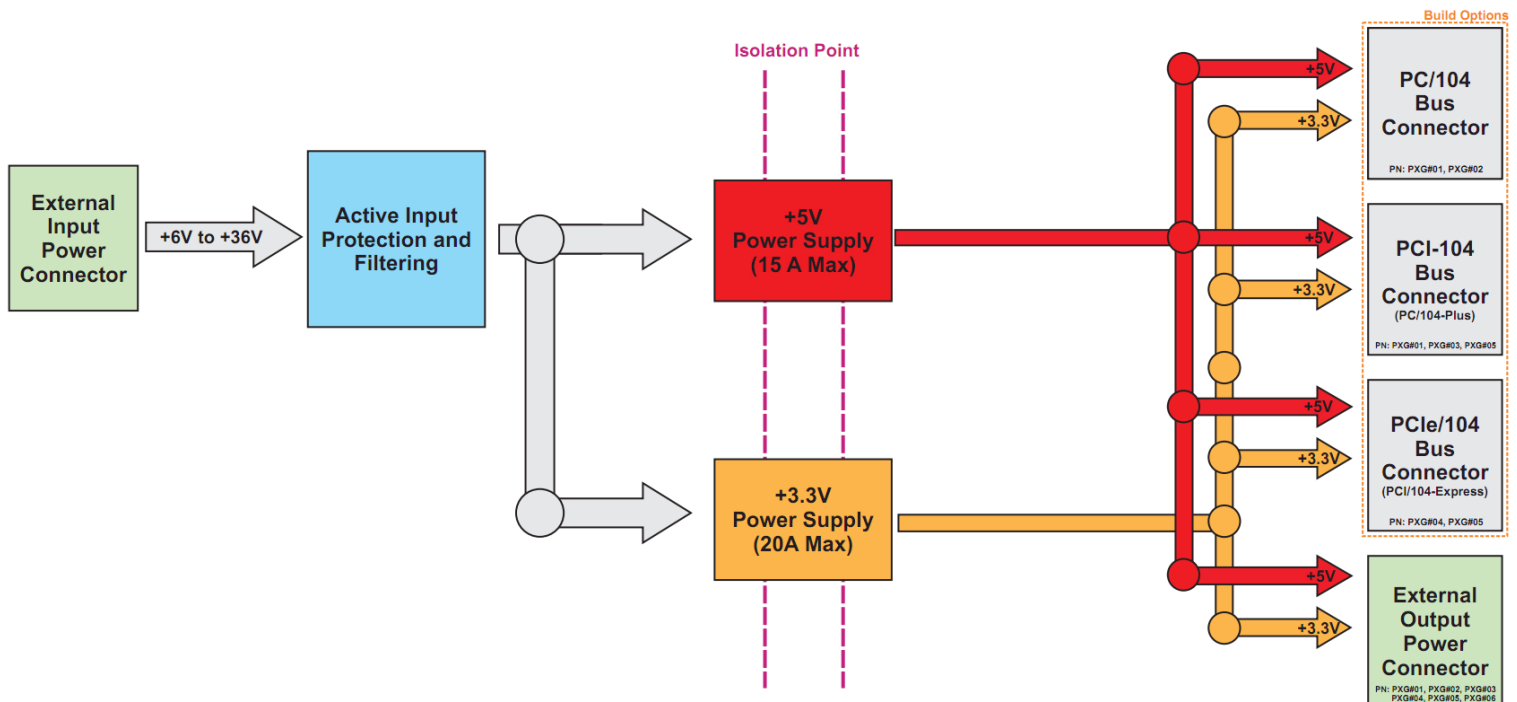
## Functional Block Diagram (SP & HP Models)

Part Numbers: PXG10# and PXG30#

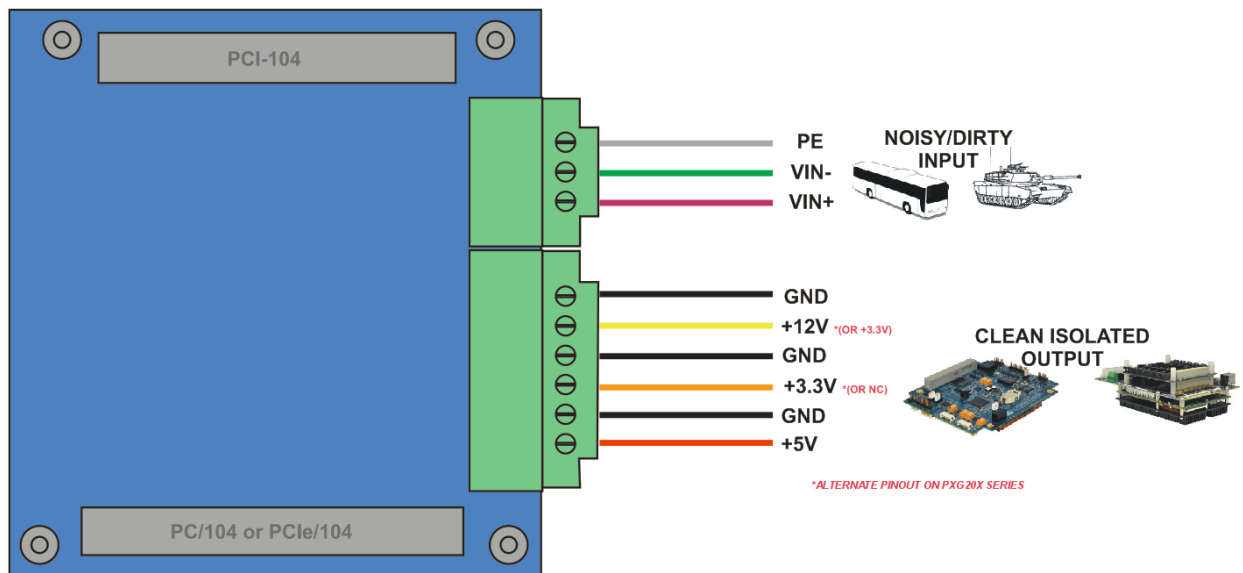
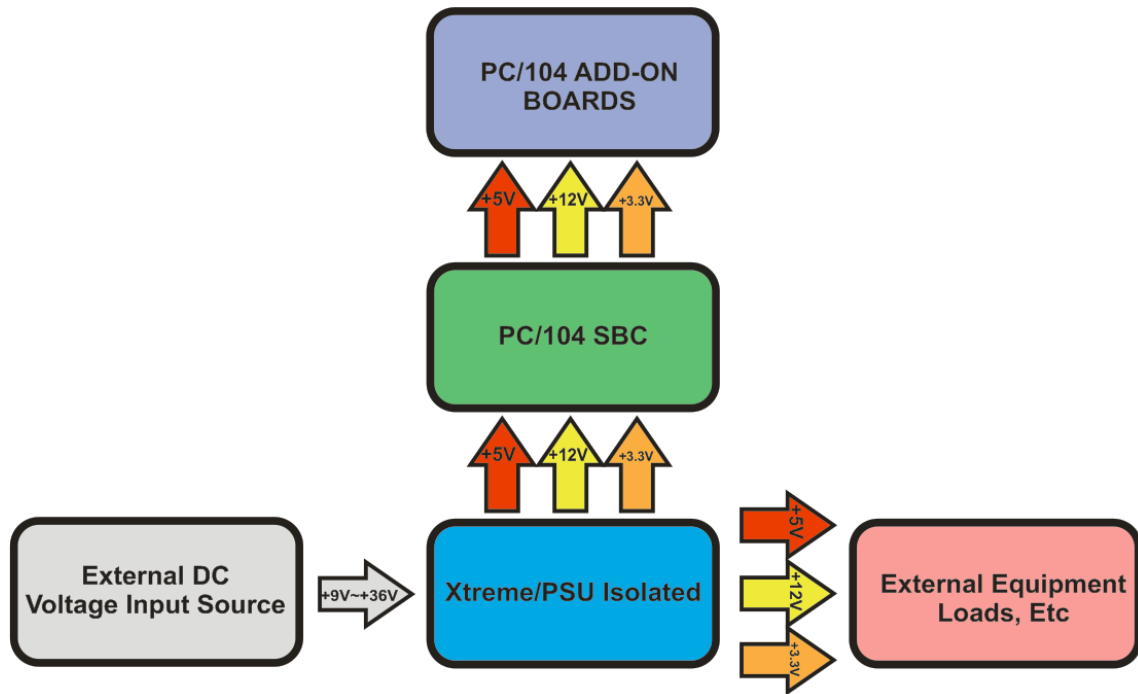


## Functional Block Diagram (LP Model)

Part Numbers: PXG20#



## Example Usage Block Diagram





## Part Number Information

Below is table with a listing of available parts numbers for Xtreme/PSU Isolated family.

Part Number	Series	+5V Power	+12V Power	+3.3V Power	Bus Connectors
PXG101	SP	15A	6A	5A	PC/104-Plus
PXG102	SP	15A	6A	5A	PC/104
PXG103	SP	15A	6A	5A	PCI-104
PXG104	SP	15A	6A	5A	PCle/104
PXG105	SP	15A	6A	5A	PCI/104-Express
PXG106	SP	15A	6A	5A	None Installed
PXG107	SP	15A	6A	-	PC/104-Plus
PXG108	SP	15A	6A	-	PC/104
PXG109	SP	15A	6A	-	PCI-104
PXG110	SP	15A	6A	-	PCle/104
PXG111	SP	15A	6A	-	PCI/104-Express
PXG112	SP	15A	6A	-	None Installed
PXG201	LP	15A	-	20A	PC/104-Plus
PXG202	LP	15A	-	20A	PC/104
PXG203	LP	15A	-	20A	PCI-104
PXG204	LP	15A	-	20A	PCle/104
PXG205	LP	15A	-	20A	PCI/104-Express
PXG206	LP	15A	-	20A	None Installed
PXG301	HP	15A	10A	5A	PC/104-Plus
PXG302	HP	15A	10A	5A	PC/104
PXG303	HP	15A	10A	5A	PCI-104
PXG304	HP	15A	10A	5A	PCle/104
PXG305	HP	15A	10A	5A	PCI/104-Express
PXG306	HP	15A	10A	5A	None Installed
PXG307	HP	15A	10A	-	PC/104-Plus
PXG308	HP	15A	10A	-	PC/104
PXG309	HP	15A	10A	-	PCI-104
PXG310	HP	15A	10A	-	PCle/104
PXG311	HP	15A	10A	-	PCI/104-Express
PXG312	HP	15A	10A	-	None Installed

To order any of these part numbers or to inquire about the other available ordering options please contact [sales@connecttech.com](mailto:sales@connecttech.com) for further information.

## Hardware Installation

The *Xtreme/PSU Isolated* can be installed into a PC/104 type stack to provide power to the stack through its bus connectors or external power connector. The Xtreme/PSU can also be used as a stand-alone embedded power supply to provide power to any other piece of equipment of embedded SBC.

To install the Xtreme/PSU in your system please follow these steps:

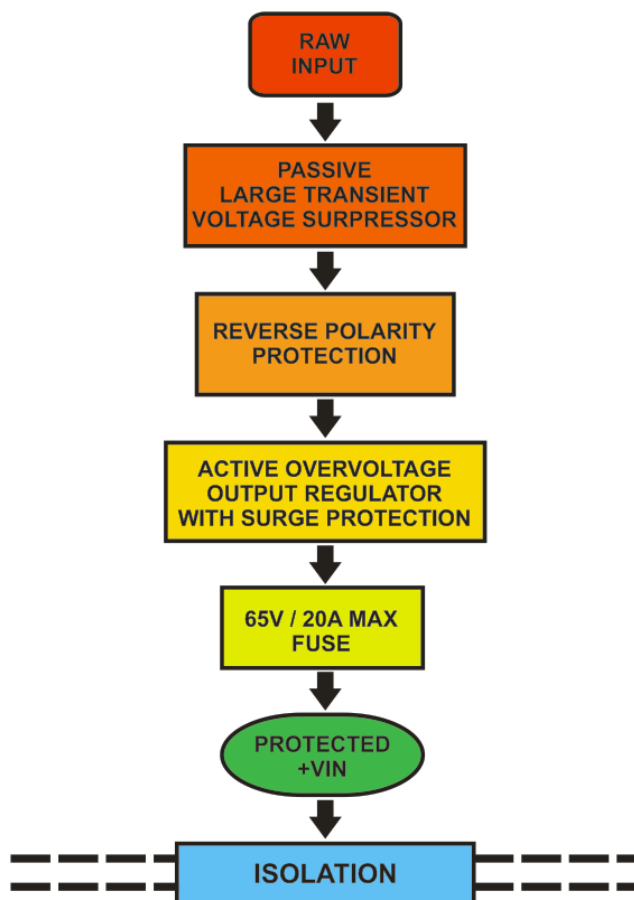
1. Ensure your DC input power is OFF (+9V to +36V).
2. Install standoffs into system.
3. Insert Xtreme/PSU onto stack (bottom, middle or top) connecting its bus connectors to PC/104, PCI-104, or PCIe/104.
4. Ensure board is bolted/screwed into stack.
5. Install the appropriate Jumpers on the Xtreme/PSU. (If the PE input pin is NOT used, ensure that the "Enable Always On" Jumper IS installed.
6. Connect any external power connections to the Xtreme/PSU's External Power Connector.
7. Connect input power connection to the Xtreme/PSU's Input Power Connector.
8. Power on input power to power up the system.

## Input Power

The Xtreme/PSU Isolated is meant to use any DC input power source in the range of **+9V to +36V DC**, which is ideal for many vehicle or mobile application, but also many industrial power solutions as well. This input power source will be galvanically isolated from the output rails and free from any noise present on the input side.

### Input Power Diagram

Below is diagram of the flow of the input power on the Xtreme/PSU Isolated. The input power goes through many protection, safety and isolation components before connecting to the output power supplies.



## Active Input Power Protection Details

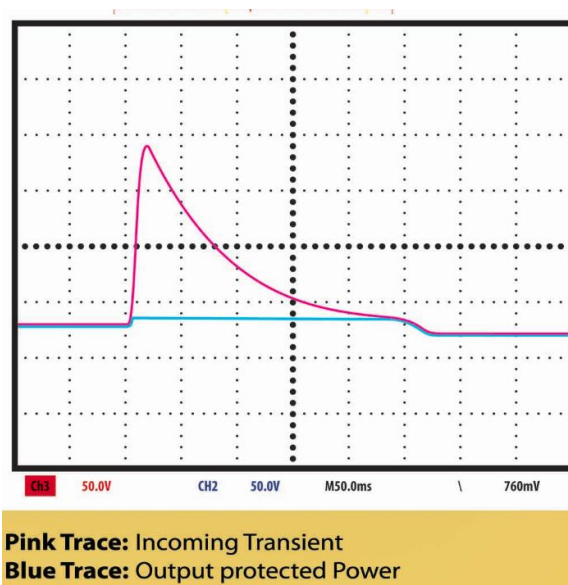
The main benefit to using the Xtreme/PSU Isolated protects loads from high voltage input transients. It regulates the output during an overvoltage event, such as load dump in vehicles, by controlling the gate of an external N-channel MOSFET. The output is limited to a safe value allowing the loads to continue functioning.

The Xtreme/PSU Isolated also monitors the voltage drop to protect against overcurrent faults. In either fault condition, a timer is started inversely proportional to MOSFET stress. If a fault condition persists, the supply is turned off.

Two precision comparators monitor the input supply for overvoltage (OV) and undervoltage (UV) conditions. When the potential is below the UV threshold, the external MOSFET is kept off. If the input supply voltage is above the OV threshold, the MOSFET is not allowed to turn back on. Back-to-back MOSFETs are used for reverse input protection, reducing voltage drop and power loss.

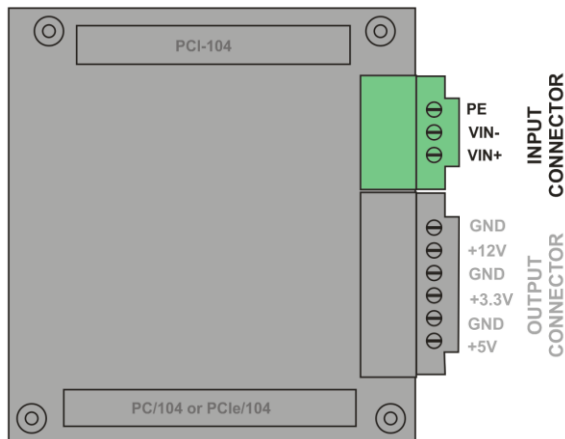
This input power protection is ideal for applications such as:

- Automotive/Avionic Surge Protection
- Hot Swap/Live Insertion
- Intrinsic Safety Applications

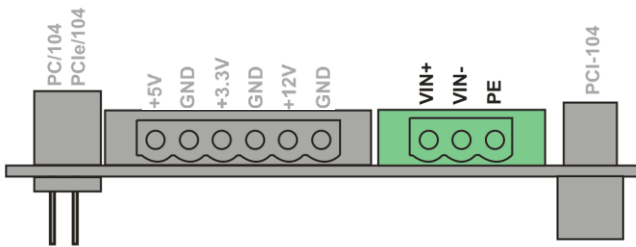


## Input Power Connector Pinout

### Top View



### Side View



### Pin Descriptions

Pin	Details
1 – VIN+	Positive Input Terminal. <ul style="list-style-type: none"> <li>Connect this pin to your main input power source</li> </ul>
2 – VIN-	Negative Input Terminal. <ul style="list-style-type: none"> <li>Connect this pin to your input power source ground/return connection</li> </ul>
3 – PE	Power Enable <ul style="list-style-type: none"> <li>This pin can be used to remotely turn ON or OFF the Xtreme/PSU Isolated</li> </ul>

### Input Connector

The input power connector on the Xtreme/PSU Isolated is a standard 3-pin 5mm pitch terminal block connector that mates to a shrouded 5mm screw terminal plug. With your purchase of the Xtreme/PSU you will have received a mating plug connector, below is a list of plug part numbers that are compatible with the PSG.

#### Input Power Connector Plug Compatible Part Numbers

Part Number: 20020003-G031B01LF	Manufacturer: FCI
Part Number: 796858-3	Manufacturer: TE Connectivity
Part Number: 1835481	Manufacturer: Phoenix Contact
Part Number: OSTVM037552	Manufacturer: On Shore Technology Inc

## **Power Enable (PE) Pin Functionality / Remote ON/OFF**

The PE (Power Enable) pin is an isolated active high input pin that can be used to turn the *Xtreme/PSU Isolated*'s output rails ON or OFF. This can be useful for a connection to an outside external logic source or vehicle ignition sense line. Driving the PE pin to a voltage greater than +9V and less than +36V will turn ON the isolated voltage outputs. Driving the PE pin to ~0V will disable and turn OFF all of the isolated output voltages.

It is important to note that the PE pin is on the NON-Isolated side of the power supply and should not be driven or connected to any isolated (clean) sources.

### **Enable Always On Jumper**

When remote ON/OFF functionality **is NOT needed**, simply install the J2 jumper and the *Xtreme/PSU Isolated* will always turn ON it's isolated output rails whenever power is applied to the VIN+/VIN- terminals.



## Output Power

The Xtreme/PSU is meant to use any DC input power source in the range of +6V to +36V DC, which is ideal for many vehicle or mobile application, but also many industrial power solutions as well.

### Technical Specifications

The Xtreme/PSU Isolated outputs 3 main voltage rails:

- +5V @ up to 10A
- +12V @ up to 10A
- +3.3V @ up to 20A

All outputs provide:

- Current Limiting Protection
- Overvoltage Protection
- Remote ON/OFF control

Detailed graphs/charts on output power be found in the [Detailed Specifications and Graphs](#) section of this manual.

Below is a breakdown of the various output power series available, please refer to the [Part Number Information](#) section to see a complete breakdown by orderable part number.

Power Series Options	LP	SP	HP
<b>Input Voltage Range</b>	+9V to +36V DC	+9V to +36V DC	+18V to + 36V DC
<b>Isolation Rating</b>	1.5kV	1.5kV	2.25kV
<b>+3.3V Output Current</b>	20A	5A	5A
<b>+5V Output Current</b>	15A	15A*	15A*
<b>+12V Output Current</b>	-	6A	10A
<b>Total Power</b>	141W	147W	195W
* SP & HP +3.3V rail is derived from the +5V rail			

### Output Connector

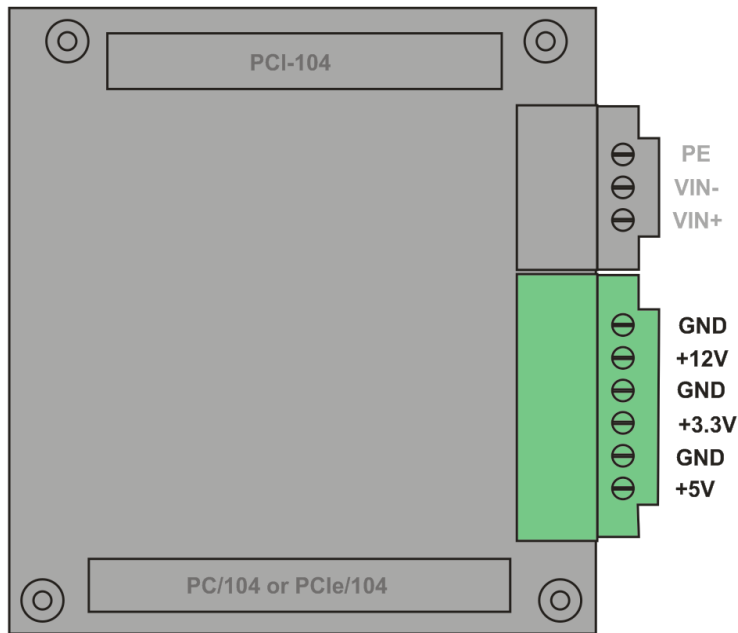
The input power connector on the Xtreme/PSU Isolated is a standard 3-pin 5mm pitch terminal block connector that mates to a shrouded 5mm screw terminal plug. With your purchase of the Xtreme/PSU you will have received a mating plug connector, below is a list of plug part numbers that are compatible.

#### Input Power Connector Plug Compatible Part Numbers

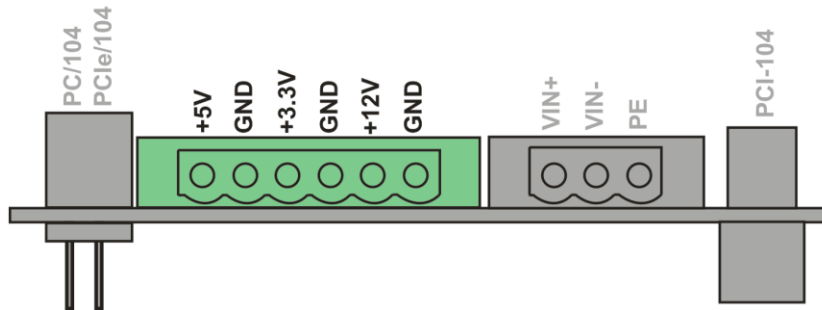
Part Number: 20020003-G061B01LF	Manufacturer: FCI
Part Number: 796858-6	Manufacturer: TE Connectivity
Part Number: 1835481	Manufacturer: Phoenix Contact
Part Number: OSTVM067552	Manufacturer: On Shore Technology Inc

## Output Power Connector Pinout (SP PXG10# & HP PXG30# models only)

### Top View



### Side View



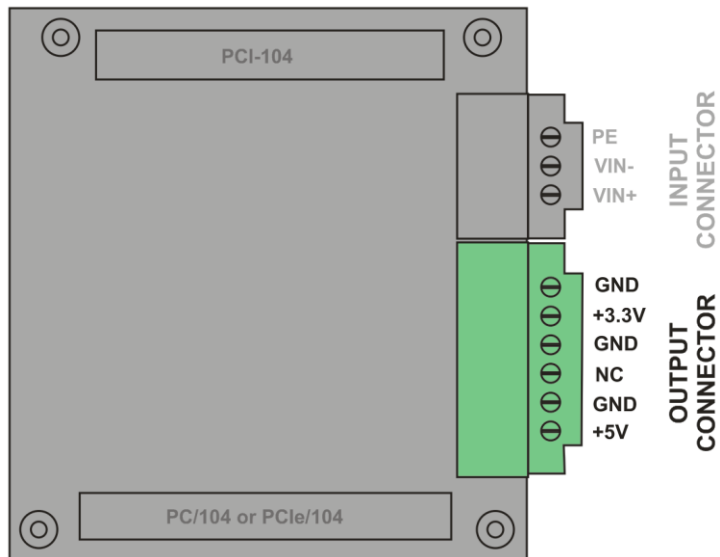
### Pin Descriptions

Pin	Details
1 – +5V	+5V Output Pin
2 – GND	Ground Pin
3 – +3.3V	+3.3V Output Pin
4- GND	Ground Pin
5 - +12V	+12V Output Pin
6 - GND	Ground Pin

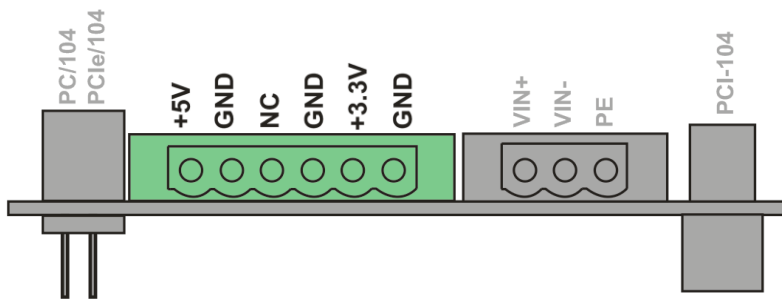


## Output Power Connector Pinout (LP PXG20# models only)

### Top View



### Side View



### Pin Descriptions

Pin	Details
1 – +5V	+5V Output Pin
2 – GND	Ground Pin
3 – +3.3V	+3.3V Output Pin
4- GND	Ground Pin
5 - NC	No Connect Pin (No output here)
6 - GND	Ground Pin



## PC/104 Pinout

### Connector Location and Pin Orientation

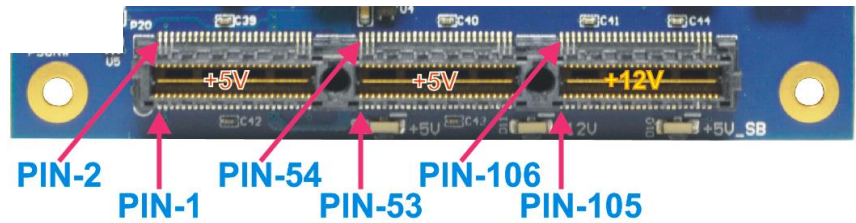


### Pinout Table

Pin	A	B	C	D
1	NC	GND	NC	GND
2	NC	NC	NC	NC
3	NC	+5V	NC	NC
4	NC	NC	NC	NC
5	NC	NC	NC	NC
6	NC	NC	NC	NC
7	NC	NC	NC	NC
8	NC	NC	NC	NC
9	NC	+12V	NC	NC
10	NC	NC	NC	NC
11	NC	NC	NC	NC
12	NC	NC	NC	NC
13	NC	NC	NC	NC
14	NC	NC	NC	NC
15	NC	NC	NC	NC
16	NC	NC	NC	NC
17	NC	NC	NC	+5V
18	NC	NC	NC	NC
19	NC	NC	NC	GND
20	NC	NC	KEY	GND
21	NC	NC		
22	NC	NC		
23	NC	NC		
24	NC	NC		
25	NC	NC		
26	NC	NC		
27	NC	NC		
28	NC	NC		
29	NC	+5V		
30	NC	NC		
31	NC	GND		
32	GND	GND		

PCIe/104 (PCI/104-Express Pinout)

Connector Location and Pin Orientation



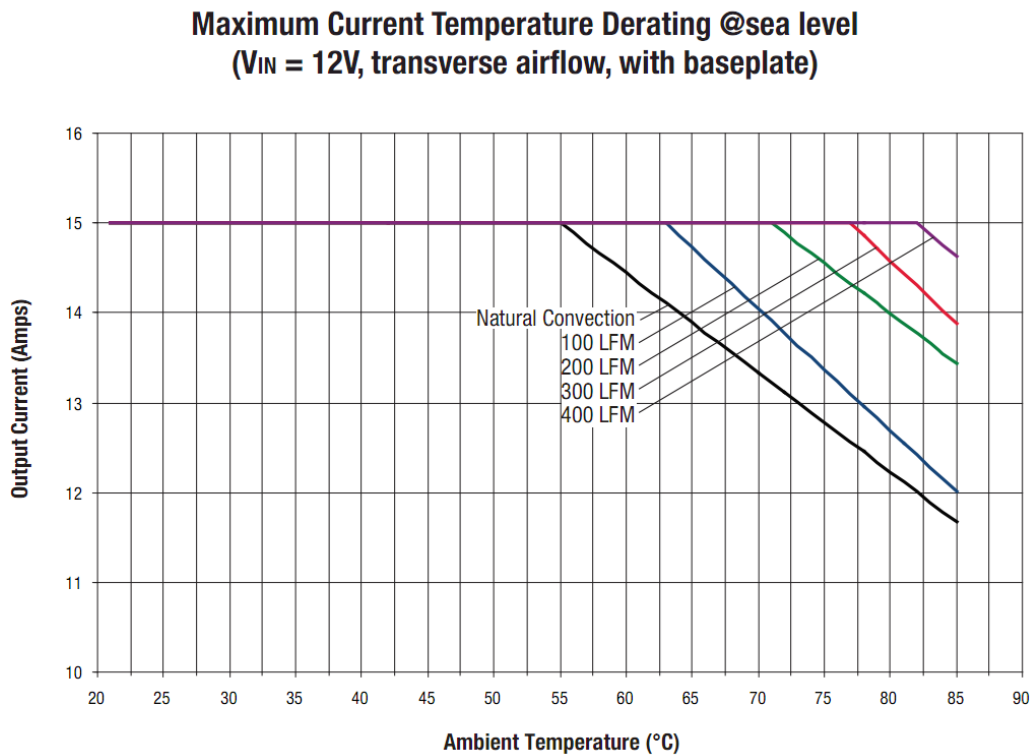
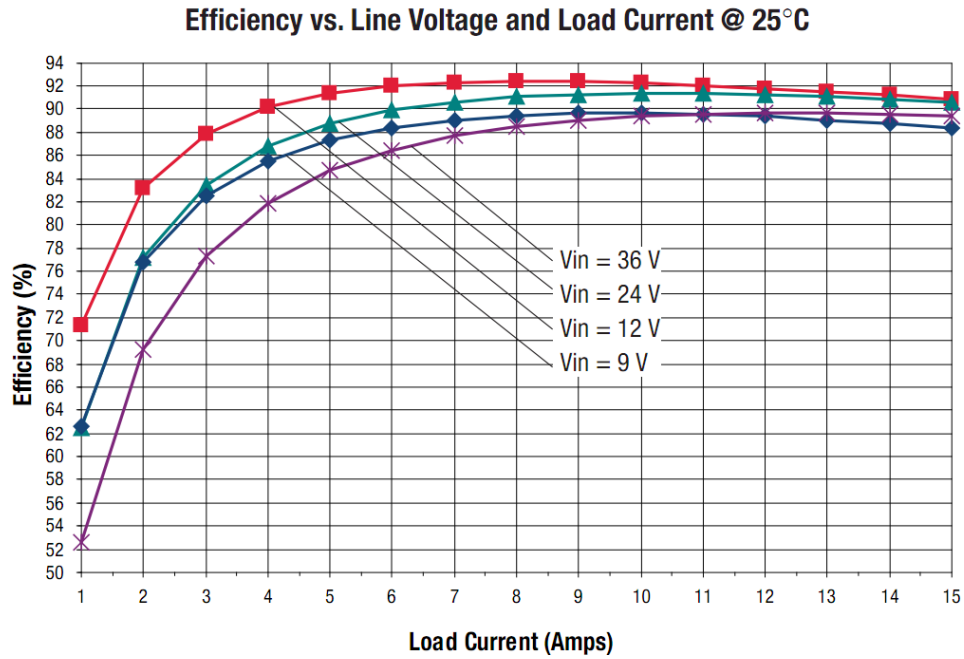
Pinout Table

1	NC	NC	2
3	+3.3V	+3.3V	4
5	NC	NC	6
7	NC	NC	8
9	GND	GND	10
11	NC	NC	12
13	NC	NC	14
15	GND	GND	16
17	NC	NC	18
19	NC	NC	20
21	GND	GND	22
23	NC	NC	24
25	NC	NC	26
27	GND	GND	28
29	NC	NC	30
31	NC	NC	32
33	GND	GND	34
35	NC	NC	36
37	NC	NC	38
39	+5V_SB	+5V_SB	40
41	NC	NC	42
43	NC	NC	44
45	NC	PWRGOOD	46
47	NC	NC	48
49	NC	NC	50
51	NC	PSON#	52
53	NC	NC	54
55	GND	GND	56
57	NC	NC	58
59	NC	NC	60
61	GND	GND	62
63	NC	NC	64
65	NC	NC	66
67	GND	GND	68
69	NC	NC	70
71	NC	NC	72
73	GND	GND	74
75	NC	NC	76
77	NC	NC	78
79	GND	GND	80
81	NC	NC	82
83	NC	NC	84
85	GND	GND	86
87	NC	NC	88
89	NC	NC	90
91	GND	GND	92
93	NC	NC	94
95	NC	NC	96
97	GND	GND	98
99	NC	NC	100
101	NC	NC	102
103	GND	GND	104
105	NC	NC	106
107	GND	GND	108
109	NC	NC	110
111	NC	NC	112
113	GND	GND	114
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119	GND	GND	120
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131	GND	GND	132
133	NC	NC	134
135	NC	NC	136
137	GND	GND	138
139	NC	NC	140
141	NC	NC	142
143	GND	GND	144
145	NC	NC	146
147	NC	NC	148
149	GND	GND	150
151	NC	NC	152
153	NC	NC	154
155	GND	GND	156

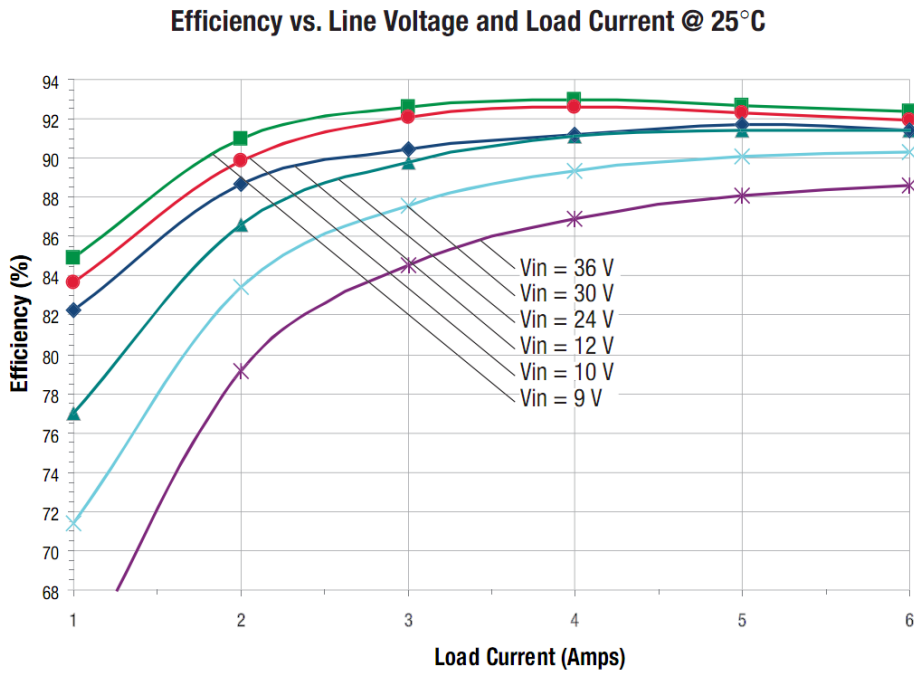
## Deratings Graphs

### SP Series - PXG10X

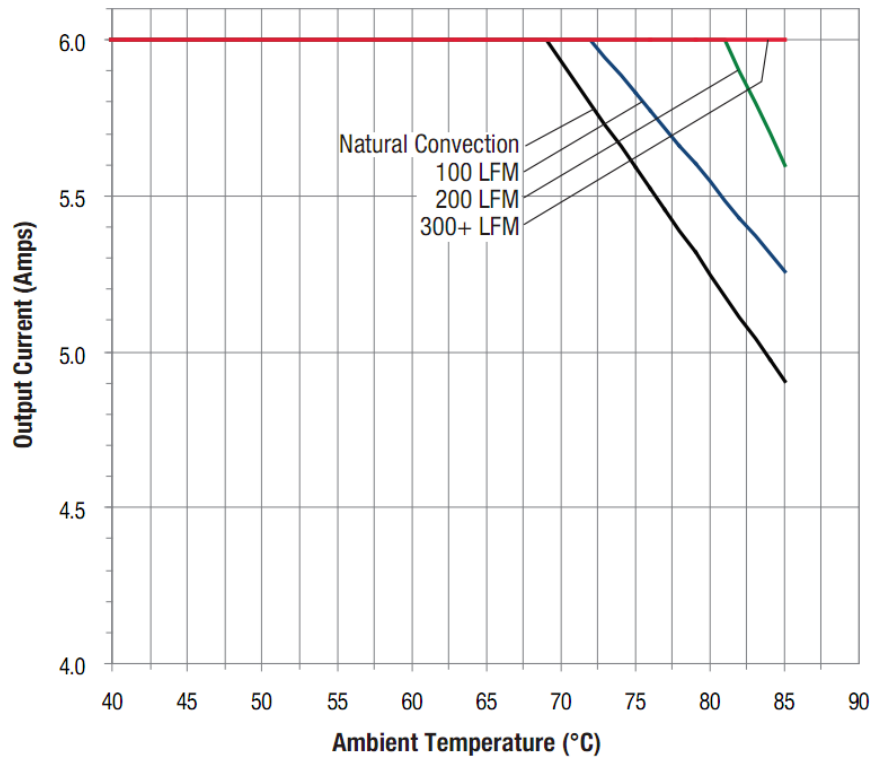
+5V Output



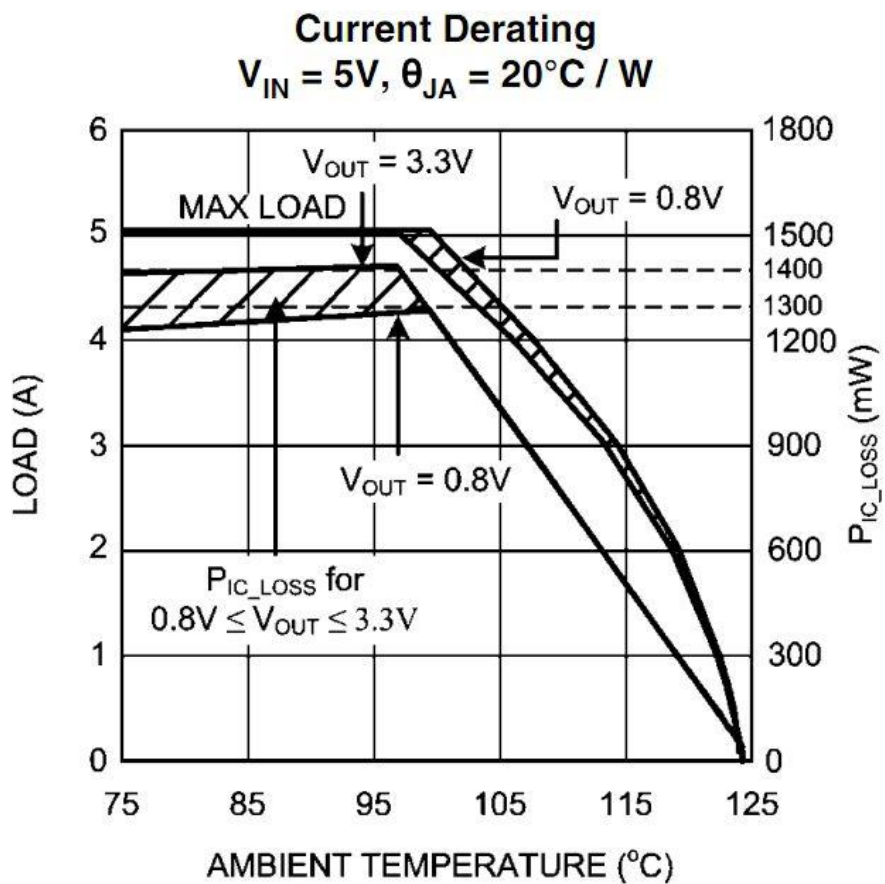
## +12V Output



## Maximum Current Temperature Derating @sea level ( $V_{IN} = 12V$ , transverse airflow, with baseplate)



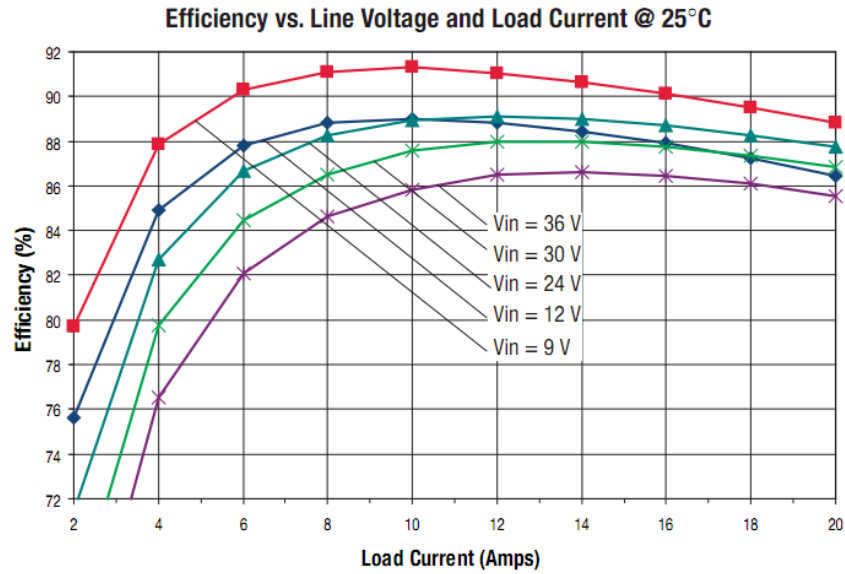
+3.3V Output (Also used for HP series)



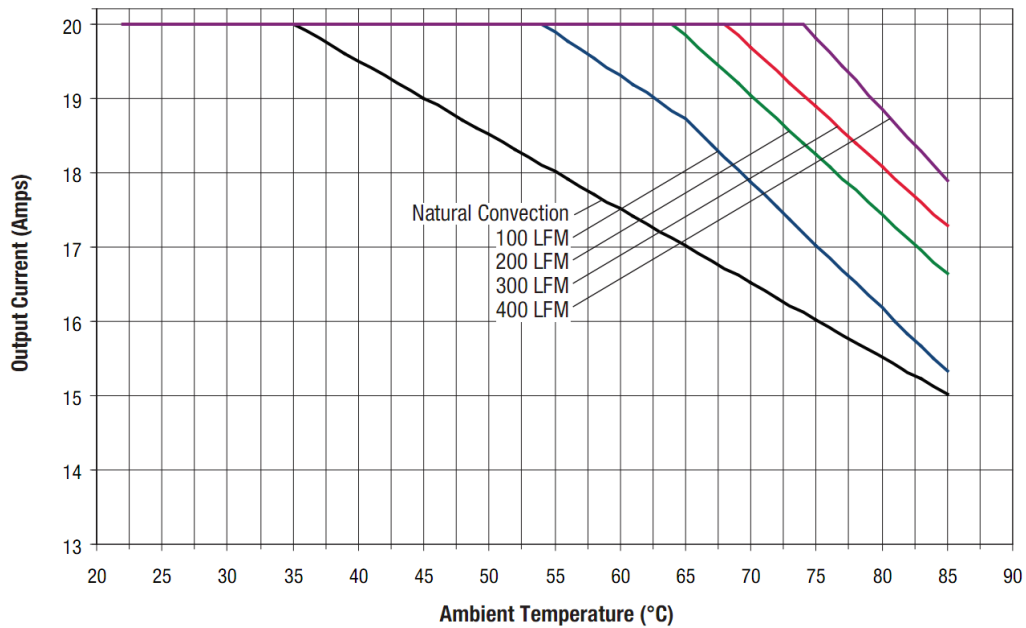
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## LP Series – (PXG20X)

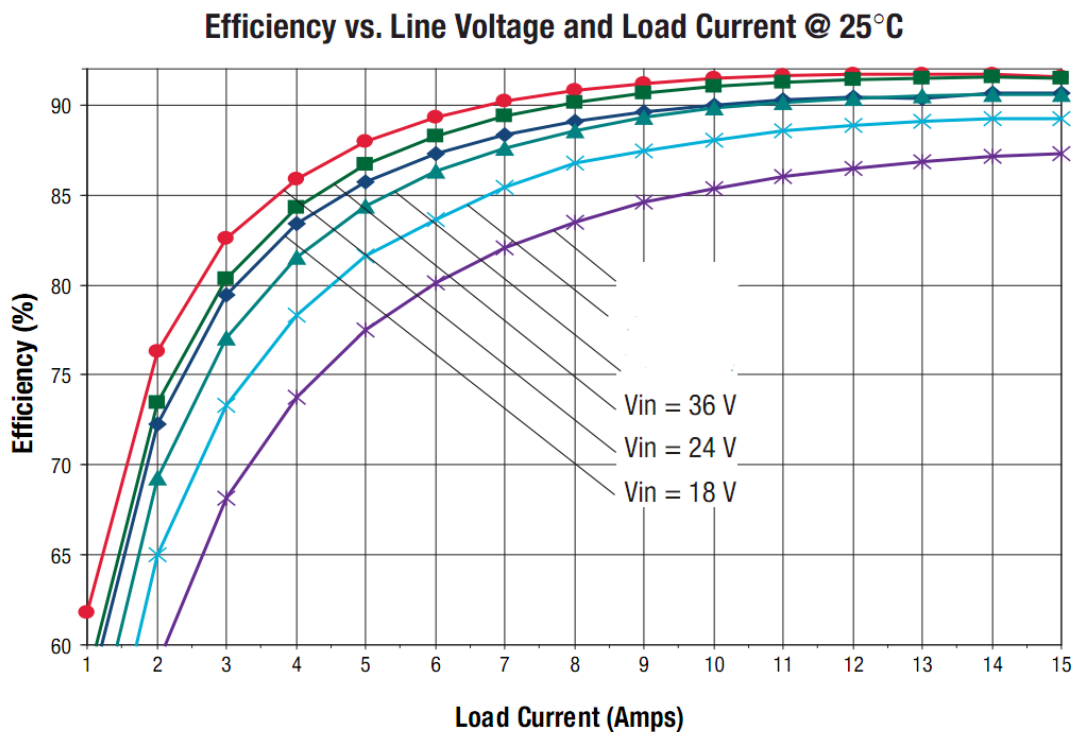
### +3.3V Output



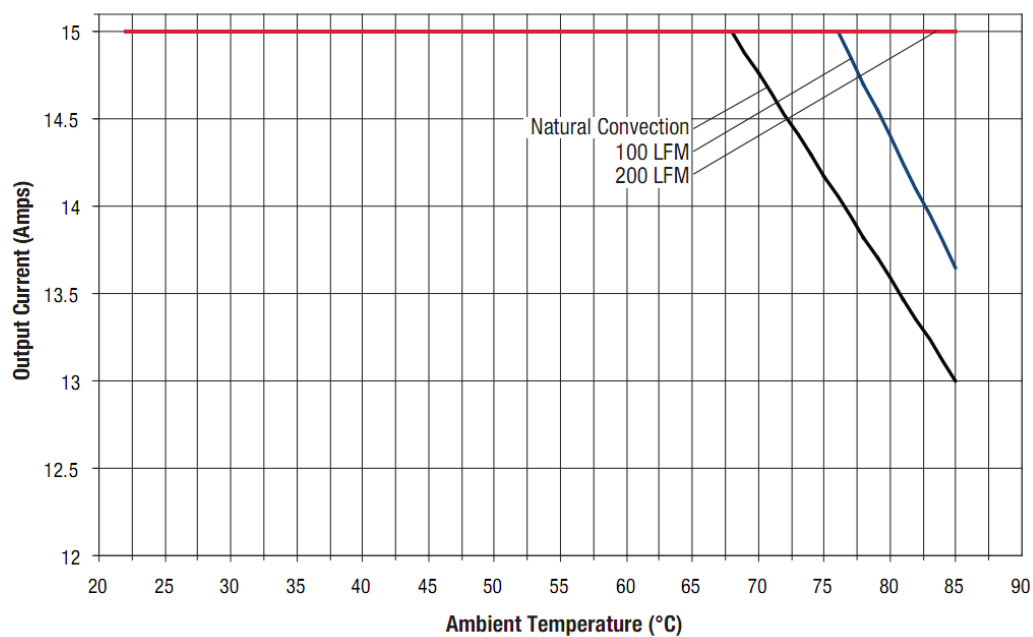
### Maximum Current Temperature Derating @sea level ( $V_{IN} = 12V$ , transverse airflow, with baseplate)





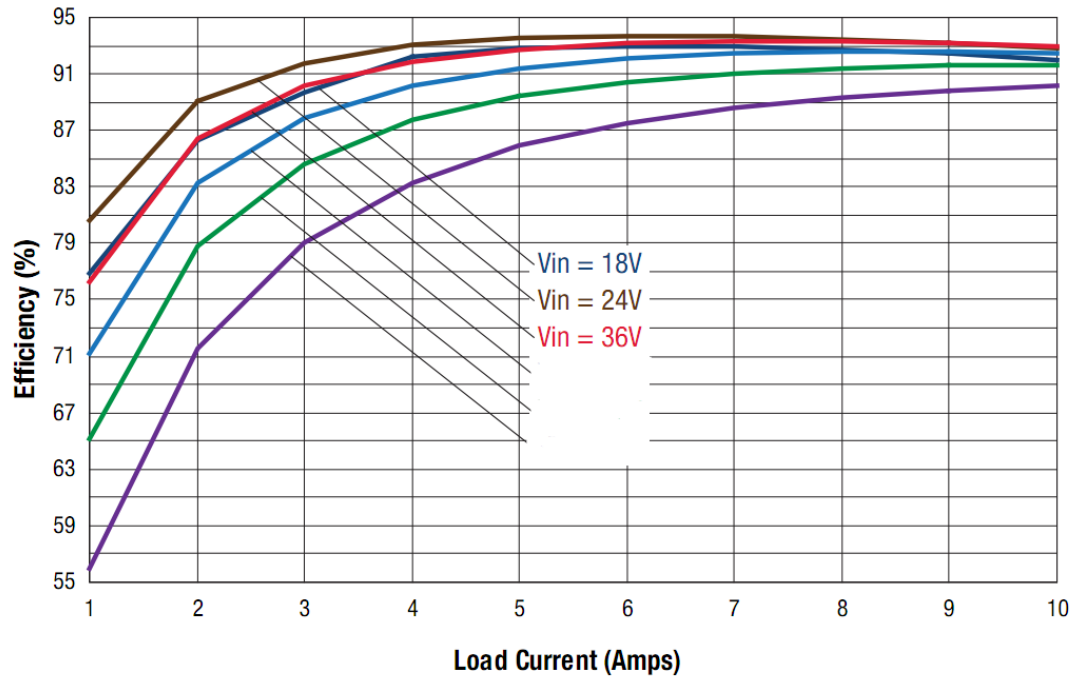
**HP Series – PXG30X****+5V Output**

**Maximum Current Temperature Derating @sea level**  
**( $V_{IN} = 24V$ , transverse airflow, with baseplate)**

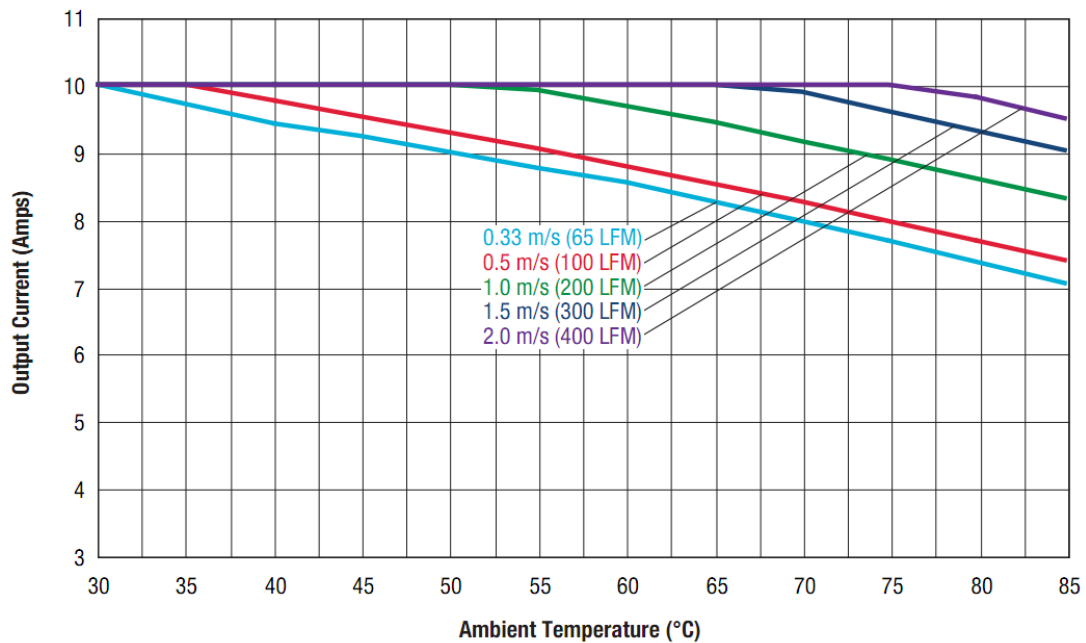


## +12V Output

**Efficiency vs. Line Voltage and Load Current @ 25°C**



**Maximum Current Temperature Derating @sea level  
( $V_{IN} = 24V$ , transverse airflow, with baseplate)**



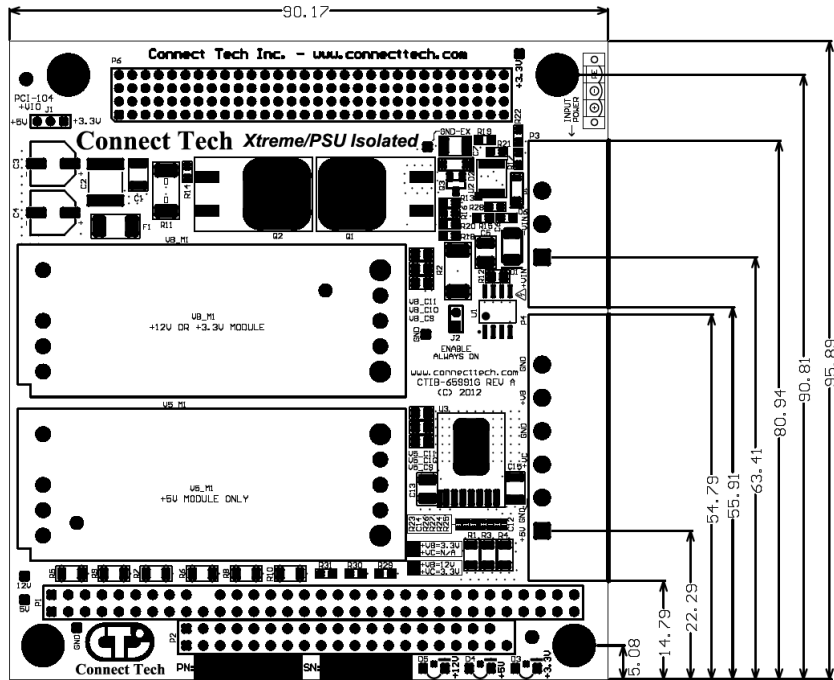


## Dimensioned Drawings

Download 3D Step Model Files Here:

[http://www.connecttech.com/ftp/3d\\_models/PXG00X\\_3D\\_MODEL.zip](http://www.connecttech.com/ftp/3d_models/PXG00X_3D_MODEL.zip)

Dimensions in Millimeters



Dimensions in Inches

